REMARKS/ ARGUMENTS

The applicants respectfully traverse this rejection for the reasons set out below, and ask the Examiner for reconsideration.

SUMMARY OF THE OFFICE ACTION

Claims 1-2 stand rejected under § 102 as allegedly being anticipated by U.S. patent no. 6442134 of Mitchell (hereinafter "Mitchell").

Claims 3-15, 20-31 stand rejected under § 103(a) as allegedly being anticipated by Mitchell in view of U.S. patent application no. 2001/0019536 of Suzuki (hereinafter "Suzuki").

Claims 16-19 stand rejected under § 103(a) as allegedly being anticipated by Mitchell in view of Suzuki and further in view of U.S. patent 6538987.

Claims 1-2 were cancelled

The inventors conceived the invention before the U.S. filing date of Suzuki

Suzuki was filed in the U.S. on March 5, 2001.

The invention that is the subject matter of U.S. patent 09/843,363 was conceived during the second half of 2000 and prior to October 2000.

On October 25 2000 Joshua Klipper, one of the inventors of U.S. patent 09/843,363 sent to the Legal department of ADC Telecommunication Inc. of Indianapolis. U.S.A., a "Record of Invention" form titled "Simplified ATM ring protection for Access Network". This Record of invention described a simplified facility protection scheme for ATM on SDH/SONET ring topologies.

This "Record of invention" describes the subject matter of U.S. patent application 09/843,363 and is attached to the Declaration of Mr. Joshua Klipper as APPENDIX A.

Accordingly, the applicant believes that Suzuki is not a prior art reference in the meaning of 103(a), and the rejection of claims 3-31 is overcome.

Claims 3-31 should be allowed.

Attachment: Declaration and Appendix A

Respectfully submitted,

SONNENSCHEIN NATH & ROSENTHAL LLP

Date: March 27, 2006

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Appendix A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent of : Klipper ATTY Ref: 100.164US01

Serial number : 09/843363

Filed April 25 2001

For : SIMPLIFIED ATM RING PROTECTION FOR ACCESS NETWORKS

Sir

DECLERATION OF JOSHUA KLIPPER

I, Joshua Klipper declare and say of my own personal knowledge and belief:

1. THAT I am an inventor of U.S. patent application serial number 09/843363.
2. THAT during 2000 I was an employee of ADC Telecommunications Israel, a subsidiary of ADC Telecommunication Inc. of Minneapolis, U.S.A.
3. THAT during second half of 2000 (and prior to October 2000) I conceived the idea that is the subject matter of U.S. patent application 09/843363.
4. THAT at October 25 2000 I sent to the legal department of ADC Telecommunications Inc. a "Record of invention" form titled "Simplified ATM ring protection for Access Network". This Record of invention described a simplified facility protection scheme for ATM on SDH/SONET ring topologies. This Record of invention describes the subject matter of U.S. patent application 09/843363.
   The record of invention form is attached and referred to as APPENDIX A.
5. THAT I conceived the invention that is the subject matter of U.S patent application 09/843363 before March 5 2001, which is the U.S. filing date of U.S. patent application publication number 2001/0019536 of Suzuki.
6. THAT, I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful statements may jeopardize the validity of the application or any patent issued thereon.

May 23 2005
Date

Joshua Klipper
Joshua Klipper

Telecommunications

Record of Invention

ADC RESTRICTED

R.I. No.		Page 1 of 2

Title
Simplified ATM Ring Protection for Access Network

Investigator (full first name, middle initial, last name)	Investigator (full first name, middle initial, last name)
Full Name: Joshua Klipper	Full Name: Gideon Agmon
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Tech. Ntbk. No.:	Tech. Ntbk. No.:
Div. or Lab Name: ADC Teledata Communications	Div. or Lab Name: ADC Teledata Communications

Investigator (full first name, middle initial, last name)	Investigator (full first name, middle initial, last name)
Full Name:	Full Name:
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Citizenship:	Citizenship:
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Home Address:	Home Address:
Citizenship:	Citizenship:
Tech. Ntbk. No.:	Tech. Ntbk. No.:
Div. or Lab Name:	Div. or Lab Name:

Information relating to this invention was first written down on or about (provide date):

Other potentially interested ADC units:
BATG

Was patent/literature search completed? ☐ Yes X No If so, by whom?
Who has the search results?

If the invention is an improvement over another product, machine or process, identify such other product, machine or process.
Optimizes ATM ring protection schemes as described in standards (Telcordia GR-2387 & ITU I.630) for headend ring applications

On what date was the first written description or drawing of this invention made, by whom was it made and attach a copy (if available).

In your opinion, was the invention described in a publication containing sufficient description to enable a person skilled in this field to understand and to make use of the invention? ☐ Yes X No
If so, when, where, by whom and to whom?

In your opinion, has an oral or written disclosure of the invention to a third party occurred? ☐ Yes X No
If so, was the invention the subject of a nondisclosure agreement? ☐ Yes X No

Have any price quotes, offers for sale or any other solicitation of sale been made to any third parties? (Date, to whom and by whom?)

If unpublished and undisclosed, provide the anticipated date of publication or public disclosure.

This invention may relate to an outside agreement. ☐ Yes X No If yes, by whom?

R.I. No.		Page 2 of 2
Title: Simplified ATM Ring Protection for Access Network		

Include: (1) Short description of the invention. Avoid use of code names, jargon, acronyms, etc. unless defined. Include as many drawings as necessary to fully describe the invention. (2) List some of the specific problems that the invention solves. (3) Describe utility of the invention, and difference(s) and advantage(s) over previous approaches. Describe the features of the invention which you believe are different from current processes or products of which you are aware. (4) List any other related information such as publications, internal reports, memoranda, formal drawings, R.I.'s.

Summary
This application describes a simplified facility protection scheme for ATM on SDH/SONET ring topologies. The proposal is suited for ATM ring applications in which traffic flow is to/from a main "headend" node from/to the other "slave" nodes as shown in Figure 1. Such applications are typically found in access or metropolitan applications.

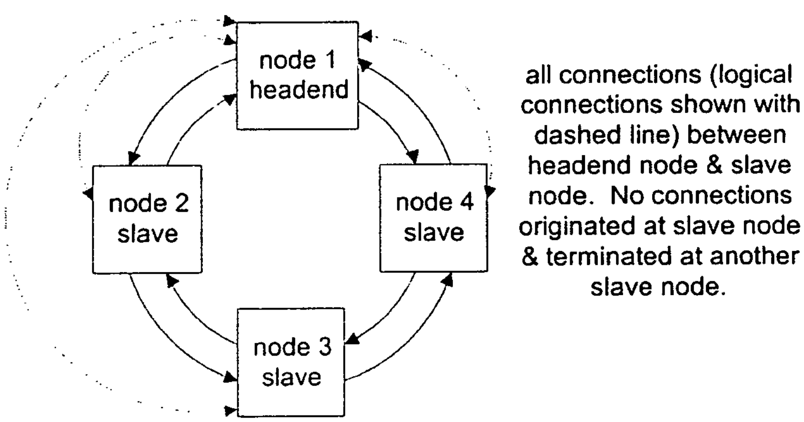


Figure 1. Headend-based Ring

Background
Modern telecommunications networks demand high availability to guarantee minimal down time for end users who rely on these networks for private or business usage. To enable such high availability, protection mechanisms are generally supported which enable continued operation even in the event of equipment or facility failures. Equipment protection generally includes the duplication of common system hardware such that a protection card can "take over" operation of a failed card. Facility protection may or may not also require duplicated hardware, but always involves one of the following schemes.

1. The duplication of traffic at the transmitting end (source) and the selection of one of the two signals at the receiving end (sink) based on alarm or error status on both received signals. While a protection protocol may also be used for reporting, it is not required for the protection switching. An example of such a scheme is 1+1 unidirectional switching as illustrated in Figure 2 or unidirectional path protection switching.

2. A protocol between the source & sink to enable the sink to signal back to the source that a facility failure was detected, and an alternate path or facility should be used for transmission. An example of such a scheme is 1+1 bidirectional switching as illustrated in Figure 3 or 1:n switching.

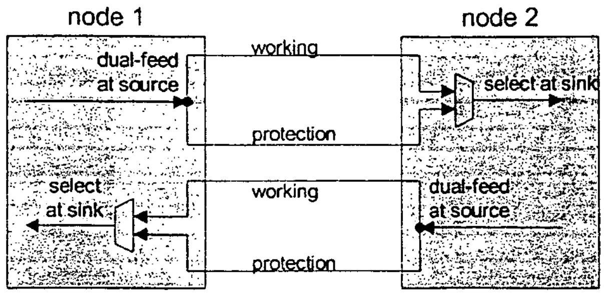


Figure 2. Dual Fed Protection Scheme

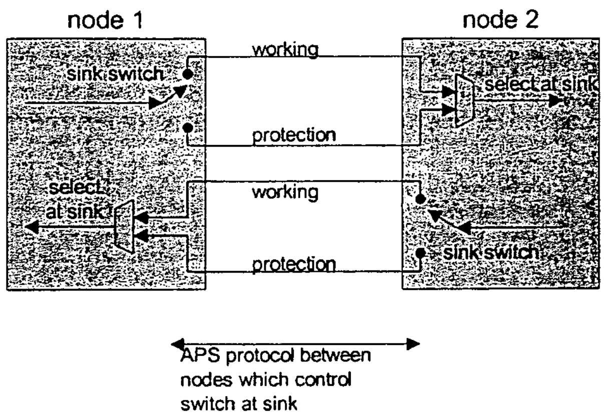


Figure 3. Protection Scheme with APS protocol

Simple point-to-point, 1+1 facility protection schemes as shown in Figure 2 are widely available and have been included in transmission equipment for over 20 years. With the introduction of SONET/SDH equipment and its use in ring topologies over the last 10 years, other SONET/SDH ring protection schemes have been standardized and are also now widely available from SONET/SDH Add Drop Multiplexer (ADM) vendors. Such schemes are include 2 or 4 fiber rings, and are generally characterized as either unidirectional or bidirectional rings. They are described in such standards as ANSI T1.105.01-1998, Telcordia (Bellcore) GR-1400-CORE, and ITU G.841 among others.

Unlike the point-to-point protection schemes, the ring protection must support traffic that is dropped at a node on the ring, as well as traffic that is passed through to a different node. Fundamentally, this is supported by using the hierarchical, structured format of SONET/SDH frames. For example, for a simple SONET/SDH OC-3 ring, where any node can add/drop any number of Virtual Tributaries/Containers (VT/VC), the SONET/SDH ring protection schemes allow each node to protect just the VT/VC's handled at that node, while the remaining VT/VC's are passed through unchanged.

The SONET/SDH ring protection schemes currently defined in standards provide a variety of options; some of the schemes provide quicker switching times and others are optimized for better bandwidth utilization. While the details of these different schemes are widely available in the standards mentioned above and are beyond the scope of this document, one fundamental aspect of all the schemes is that the protection scheme must be implemented at that level at which the traffic is added/dropped at the node; i.e. if the nodes along the ring add/drop VT/VC's, then the protection scheme must be implemented at the VT/VC level. If the nodes along the ring add/drop STS-3/STM-1, then protection must be implemented at that level. This is illustrated in Figure 4. If each node add/drops VT/VC's, and there was a facility failure between nodes 2 & 3, then node 1 can not use a protection scheme which operates at an STS-3/STM-1level since it will have to select

VT/VC's coming from nodes 1 & 2 from the STS-3/STM-1 received at port A, and select VT/VC's coming from nodes 3 & 4 from the which can be the STS-3/STM-1 received at port B. If node 1 would have to select as whole, either STS-3/STM-1 port A or port B, then either node 2 or nodes 3 & 4 would be dropped as a result of the facility failure.

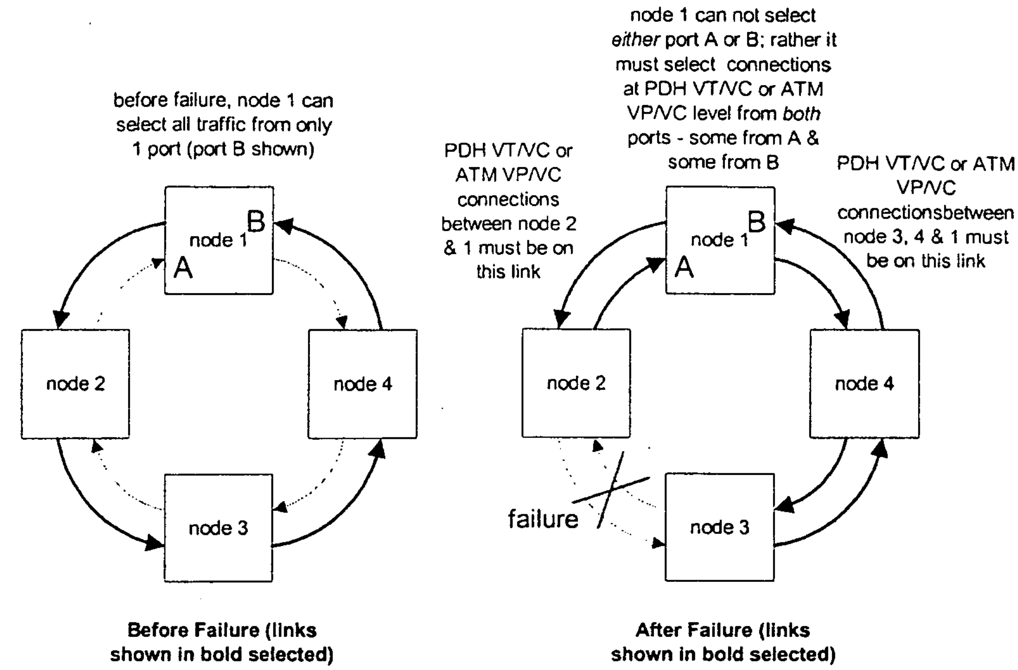


Figure 4. Ring Protection

For transport of ATM over SONET/SDH rings, the protection schemes are conceptually the same as those described above. Standards such as Telcordia (Bellcore) GR-2387 and ITU I.630 define ATM VP/VC ring protection in the same way as those defined for protection of VT/VC's over SONET/SDH. Since nodes add/drop traffic at the ATM level, SONET/SDH level protection is not enough for the same reason described above for which STS-3/STM-1 level protection is not enough for VT/VC level traffic. In Figure 4 above, if each node adds/drops ATM level VPC/VCC (Virtual Path/Circuit Connections), then for the failure shown, node 1 must be able to select some of the ATM traffic from port A and some from port B thus making STS-3/STM-1 level protection insufficient. Instead, ATM ring standards define ATM level protection schemes, which involve the monitoring of ATM level alarms and dual feeding or switching the ATM traffic in case failures are observed at the ATM level. In case of typical facility failures such as a fiber cut, many ATM level alarms at any node can be traced back to a fiber failure somewhere else on the ring as in Figure 4 above. The single fiber cut between nodes 2 & 3 may generate ATM level alarms on hundreds or thousands of ATM connections at node 1. However since node 1 does not directly "see" the fiber failure, it makes the protection switching decision based on the ATM level alarms. This was required anyway as shown above, since even if node 1 "knew" of the fiber break between nodes 2 & 3, it was necessary to perform the switching at the ATM level since while some of the ATM traffic will be dropped at node 1, other ATM level traffic may be passed through unchanged. Thus, for both these reasons, standard ATM over SONET/SDH ring protection schemes involve the monitoring & switching of traffic at the ATM – not SONET/SDH level.

Headend Rings

In the ring protection schemes described above and which are described in the referenced standards, a generic ring topology is covered in which connections can be made between any nodes on the ring. However in many applications, a single node serves as a "headend" node and all connections are to/from that node and the other slave nodes as shown in Figure 1. One common example of a network with a headend node is an access or metropolitan network.

The telecommunications access network is the part of the network between the end user and local switching center. This definition is quite broad and can include various topologies and applications. When connected in a ring topology, such access networks would include one central unit (CU; e.g. node 1 in Figure 4 above) as the headend and would typically be located at a central switching office. Multiple "remote" units (RU; e.g. nodes 2-4 in Figure 4) would act as the "slave" nodes and would be typically be located close to or at customer premises. The remote units are generally "small" nodes which aggregate traffic all of which is

destined towards the central unit; i.e. in many access applications, there is little or no traffic between the remote units.

For applications in which ATM traffic is transported over such SONET/SDH rings in which one node serves as a headend (as in the access ring example described), standard ATM level protection schemes can be used as described above. Such schemes are very generic and are suited for all types of networks – small, headend-based access rings as well as large, uniformly distributed rings connecting different offices. Alternatively, the scheme described in this proposal specifies a simpler protection scheme optimized for these headend ring applications.

Proposed Ring Operation

The proposed simplified ATM Ring operation is suitable in the following applications:

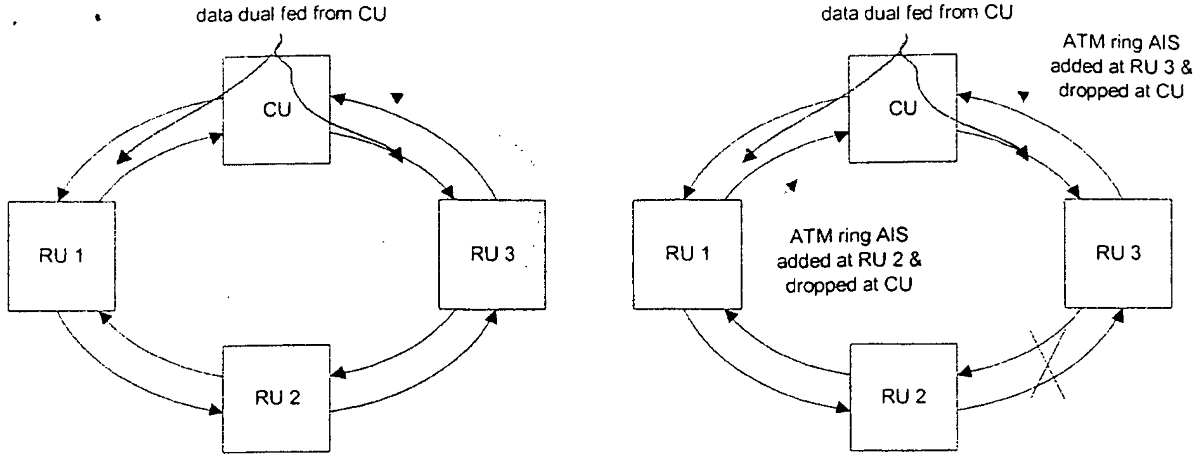
1. As described above, all traffic is between a headend node and multiple slave nodes. There is no traffic directly between slave nodes.
2. Protection is for "*ring level*" failures which affect an entire ring. Examples of such failures are SONET/SDH level failure affecting the container transporting the ATM or an ATM processing card hardware failure affecting all connections terminated at any node. Hardware failures that affect only some of the ATM connections sourced from a single node are very unusual and unlikely, and are not protected.

Ring operation is as follows (for purposes of the description below, the headend is referred to as the Central Unit – CU and the slave nodes are referred to as remote units – RU's, as typically found in access networks).

1. ATM traffic from the CU is dual fed along both rings to all the RU's.
2. Traffic dropped at the RU from the CU is dropped from one ring or the other (not both). Selection of which ring to drop from is based on the failure signals described below. Since the selection is at the ring level, it can be implemented much more simply than a selection which must be done at the ATM level (which may include up to a few thousand VPC's).
3. In the reverse direction, ATM traffic from each RU to the CU is transmitted on only one ring or the other (no both). Since traffic is not dual-fed from the RU's, no selection is done at the CU and the traffic is simply combined from both rings. If due to a failure, some of the RU's begin to switch on which ring it transmits, the CU continues to simply combine the traffic from both rings without regard to the switch performed by the RU; i.e. the CU doesn't care from which ring it receives the traffic – it simply combines ATM cells from both rings.
4. Selection of a ring for add/drop at the RU is based on two alarms – ring AIS and ring RDI. They can either be implemented as standard ATM level OAM cells on a single ATM connection between the CU and each RU, or can be SONET/SDH level signals carried over the DCC or user defined overhead bytes. They are not identical with standard SONET/SDH level AIS & RDI signals. In the description below, they are referred to as AISrng & RDIrng. These signals operate as follows.
   a) Any node detecting a *ring level* alarm (as described above) sends an AISrng signal in the downstream (forward) direction and an RDIrng signal in the upstream (backwards) direction. All nodes along the ring pass the signal on until they reach the CU where they are removed.
   b) Any node detecting a *ring level* alarm or receiving an AISrng signal should select that ring to transmit to the CU, and select the "other" ring to drop traffic from the CU.
   c) Any node receiving an RDIrng signal should select that ring both to transmit to, as well as receive from the CU.

Simplified ring operation can best be illustrated through the following 2 examples.

Example 1: Double Ring Failure

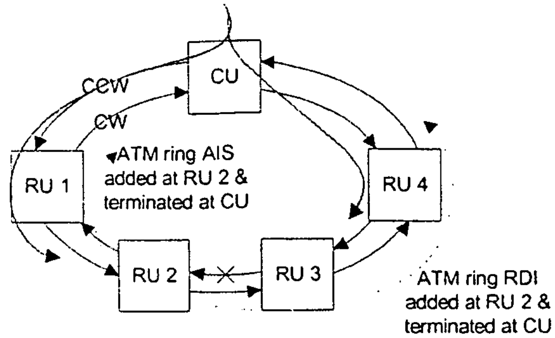


Before failure, no AIS & RDI signals, data dual fed from CU & each RU selects one ring. In reverse direction, each RU transmits in one direction only & CU "sums" traffic

After failure, RU2 & RU3 send AIS & RDI signals as shown & RU add/drop is based on those signals. No change at CU

1. CU dual feeds traffic to both rings.
2. RU2 sees failure (which effects STM-1 carrying ATM) on clockwise (CW) ring & inserts AISrng forward on CW ring. AISrng terminated at CU. It also inserts RDIrng on counterclockwise (CCW) ring but since failure is double failure, no node sees this RDIrng.
3. RU3 sees failure (which effects STM-1 carrying ATM) on CCW ring & inserts AISrng forward on CCW ring. AISrng terminated at CU. It also inserts RDIrng on CW ring but since failure is double failure, no node sees this RDIrng.
4. RU1 Operation: RU1 sees AISrng on CW ring. This means it must receive traffic from CU on CCW ring, and transmit traffic to CU on CW ring.
5. RU2 Operation: RU2 sees failure on CW ring This means it must receive traffic from CU on CCW ring, and transmit traffic to CU on CW ring.
6. RU3 Operation: RU3 sees failure on CCW ring. This means it must receive traffic from CU on CW ring, and transmit traffic to CU on CCW ring.
7. RU4 Operation: RU4 sees AISrng on CCW ring. This means it must receive traffic from CU on CW ring, and transmit traffic to CU on CCW ring.
8. In all cases, pass-thru traffic is not changed.
9. CU Operation: AISrng from both rings are terminated & not used. Transmit traffic continues to be dual fed. Traffic summed from both rings

Example 2: Single Ring Failure



1. CU dual feeds traffic to both rings.
2. RU2 sees failure (which effects STM-1 carrying ATM) on CW ring & inserts AISrng forward on CW ring. AISrng terminated at CU. It also returns RDIrng on CCW ring.
3. RU1 Operation: RU1 sees AISrng on CW ring which originated from RU2. .This means it must receive traffic from CU on CCW ring, and transmit to CU on CW ring. It passes AISrng on as was received.
4. RU2 Operation: RU2 sees failure on CW ring. This means it must receive traffic from CU on CCW ring, and transmit to CU on CW ring.
5. RU3 Operation: RU3 sees RDIrng from RU2 on CCW ring. This means transmit to and receive from CU on CCW ring.
6. RU4 Operation: RU4 sees RDIrng originated from RU2 & passed on by RU3 on CCW ring. . This means transmit to and receive from CU on CCW ring.
7. In all cases, pass-thru traffic is not changed.
8. CU Operation: AISrng & RDIrng from both rings are terminated & not used. Transmit traffic continues to be dual fed. Traffic summed from both rings

Proposed Ring Applications
The main advantage of the proposed scheme for headend ring applications such as access networks is its simplicity, which reduces the required development time. In terms of performance, it offers a compromise between standard protection schemes. Standard schemes based on dual-feeding ATM cells as the source, generally provide the fastest switching time since no rerouting of data is required. However such schemes require double the ATM processing capability to monitor for ATM alarms on the dual-fed connections. In contrast, schemes which do not dual feed ATM cells at the source, but rather use a protocol (e.g. as in 1:n Automatic Protection Switching) to enable the sink to signal to the source to reroute the traffic are generally slower, but do not require double the bandwidth or processing capability (or alternatively enable the extra bandwidth to be used for unprotected traffic). Due to its simplicity, the proposed scheme comes close to the switching time of dual-fed schemes, but doesn't required double the processing capability needed for those schemes. In contrast, it is faster than non dual-fed schemes, but doesn't allow full use of the extra bandwidth for unprotected traffic those schemes offer. These characteristics are summarized in Table 1.

	Dual-fed rings (e.g. GR-2387)	**Non-dual fed rings (e.g. 1:N APS)**	**Proposed ring**
Switchover time	Fast	Slow	Medium
Processed Bandwidth (required hardware, software, and development)	High (2 x received bandwidth)	Low (1 x received bandwidth)	Low (1 x received bandwidth)

Table 1. Ring Operation Comparison

Described by: Print or type name: Joshua Klipper Sign and date	This document has been read and understood by me. **Witness:** Print or type name: Sign and date